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DESCRIPTION

ANTENNA

This application is a National Stage application of co-pending PCT application No. PCT/JPO3/15588 12/05/2003.

5 Technical Field

The present invention relates to antennas for use in radio communication apparatuses such as a portable telephone, PDA and wireless LAN and, more particularly, to a film antenna.

10 Background Art

Recently, radio communication apparatuses such as a portable telephone, PDA (Personal Digital Assistants) and wireless LAN are daily employed. Since the radio communication apparatuses are designed on a premise that these are carried by users at all times, these apparatuses tend to be miniaturized and formed in a thin structure. With such a tendency, component parts, to be installed in the radio communication apparatuses, have similar tendencies.

In recent radio communication, there are increasing cases where a plurality of frequency bands are utilized. For example, the wireless LAN utilizes wavelengths in 2.4GHz and 5GHz bands. For this reason, the antennas for use in the radio communication apparatuses are required to be usable at a plurality of separate frequency bands.

A notebook-sized PC and a portable telephone use an inverted-F antenna, a dielectric antenna or a substrate antenna as built-in antenna. These antennas have features such as omnidirections and high-gains.

25 However, due to limited conditions in structure, it is hard to minimize the antenna in size and, especially, to form the antenna in a thin structure. When the